NURSERY NOTES

Forest Resources Branch
Queen's Park, Toronto, Ontario
September 1985 No. 112

LARGE-SCALE PRODUCTION OF JUVENILE EUROPEAN LARCH CUTTINGS

Introduction

European larch is not a major species in Ontario's reforestation program. This is mainly because sufficient volumes of seed are not available. However, vegetative propagation, through rooted cuttings, could produce the quality of planting stock required for outplanting.

In 1983, European larch seedlings were grown at Orono and cuttings were taken to assess the feasibility of rooting juvenile cuttings for large-scale production. The work was successful and proved this method of propagation could supply the large quantities of planting stock required in Southern Ontario. The objective of this note is to report on the work carried out and to document the results.

Donor Plant Production

Seeds collected in the fall of 1982, from the Orono Nursery Seed Production Area, were sown in a peat and vermiculite (60:40 by volume) medium on July 12, 1983. Fifty per cent of the untreated seed germinated. On August 19, 1983, approximately 520 seedlings were potted into five inch pots and benched under high pressure solium lamps (at 5000 1x intensity) where they received a 17-hour photoperiod. The seedlings were fertilized with every irrigation using a balanced fertilizer at 100 ppm N. After 20 weeks, the mean height, stem diameter and number of cuttings per seedling was 25.4 cm, 5.9 mm, and 19 respectively. Growth data obtained every two weeks, from measuring random samples of 25 seedlings, are shown in Figure 1.

Cutting Production

Approximately 10,000 cuttings, 3-4 cm in length were set on December 14, 1983, in 508 Japanese paper pots. The cuttings were planted in a peat and vermiculite (60:40 by volume) rooting medium and were then placed in a propagation tent under fluorescent lights, where they received a 17-hour photoperiod. The relative humidity within the tent was maintained between 70 and 100 per cent by misting lines above and below the tent and by hand misting within the tent. Light shade cloth (30 per cent shade) was used during sunny conditions. Fungicides, to prevent infestations of botrytis, were applied as foliar sprays twice a week for the first month and once a week thereafter until the seventh week. Then the cuttings were placed on an open bench.

Seven weeks after the cuttings were set, 95 per cent had rooted. Starting at week five, all cuttings were fertilized with every irrigation using balanced fertilizers at 100 ppm N. Acetic acid (99.5 per cent) was used to lower the pH of the irrigation water from 7.5 to 5.5. The cuttings were grown until April 11, 1984 after which time they were given short days to induce bud set.

The short day treatment was provided by covering them with a black vinyl cloth for 16 hours each day. The cloth was removed at 8:00 AM and replaced at 4:00 PM so that the cuttings received only eight hours of light daily. The plants did cease growing, set a bud, and at 16 weeks they averaged 17.8 cm in height and 2.7 mm in stem diameter.

Effect of IBA on Rooting

The treatment of juvenile coniferous cuttings with indolebutyric acid (IBA) was deemed unnecessary at Orono in the past. We felt there was a possibility that treating the cuttings with IBA might encourage earlier and perhaps more uniform rooting and thereby greatly reduce the risk of mortality due to rot. We decided to test this hypothesis with this European larch crop.

Some of the production stock was used to test the effects on rooting of three concentrations of IBA against an untreated control group. The treatments were as follows:

1) Control, no treatment with IBA.

2) IBA powder at 1000 ppm IBA.

3) IBA in an ethanol/water solution at 1000 ppm IBA. This solution was prepared by dissolving 10 ml of a 4000 ppm IBA powder in 15 ml of ethanol and 15 ml of water.

4) IBA in an ethanol/water solution at 2000 ppm IBA. This solution was prepared by dissolving 10 ml of a 8000 ppm IBA powder in 15 ml of ethanol and 15 ml of water.

There were four replications of each treatment with approximately 200 cuttings (one Can-Am tray) per replication.

Ten cuttings per replication (40 per treatment) were sampled for roots 30 days after setting and once a week thereafter for five weeks. Results of this test are summarized in the following table.

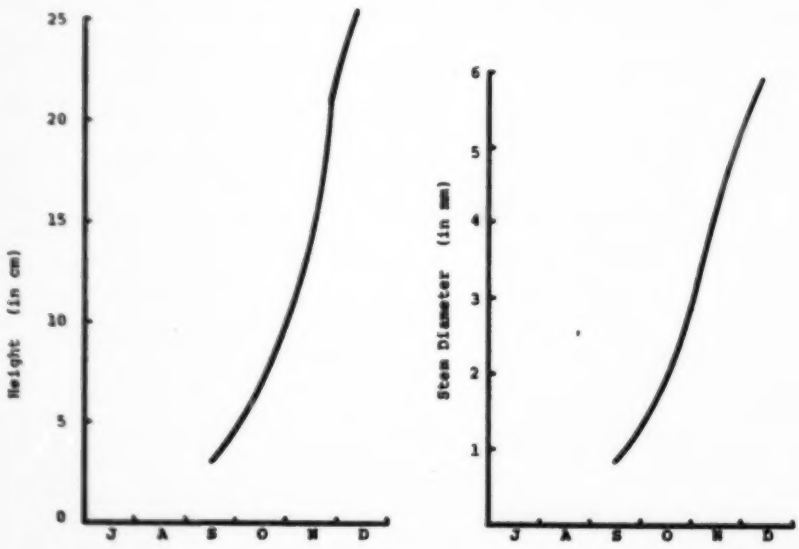

Figure 1. Height and diameter growth of European larch seedlings sown July 12, 1983 and grown until December 14, 1983.

Table 1. Rooting per cent of European larch cuttings treated with and without IBA over time. Values are means computed from four replications and each replication consisted of 10 cuttings.

Treatment	Number of Days After Setting				
	30	37	43	50	56
Control	5	42	68	95	98
IBA Powder (1000 ppm)	8	42	73	93	100
IBA Solution (1000 ppm)	25	52	80	90	95
IBA Solution (2000 ppm)	30	48	82	90	98

Quick dips in the 1000 and 2000 ppm IBA solutions did appear to promote earlier rooting. For example, on the first sampling date (30 days after setting cuttings), 25 and 30 per cent of the cuttings dipped in IBA solutions had rooted. This contrasts to the rooting of only eight and five per cent of the cuttings treated with IBA powder and the control. Rooting percentages did however even out after 50 days on the rooting bench.

Field Planting of the Cuttings

After the cuttings were incduced to set bud, they were transferred to Kemptville Nursery for conditioning prior to outplanting. The cuttings were then planted in Carleton Place District.

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